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DSM IP ASSETS B.V.

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Claims:

1. A process for the biological production of cobalamin which comprises introducing an isolated DNA into an appropriate host organism, cultivating the host organism under the condition conducive to the production of cobalamin and recovering cobalamin from the culture, said isolated DNA comprising a nucleotide sequence that encodes CobR, which is a transcriptional activator for genes involved in vitamin B₁₂ synthesis, selected from the group consisting of:

- (a) a DNA sequence identified by SEQ ID NO:1 or the complementary strand thereof;
- (b) a DNA sequence which hybridizes under stringent conditions to the DNA sequence complementary to the DNA sequence defined in (a) or a fragment thereof, and encodes a polypeptide having the activity of the transcriptional activator CobR for genes involved in vitamin B₁₂ synthesis;
- (c) a DNA sequence which codes for a polypeptide having the amino acid sequence encoded by the DNA sequence of (a) or (b);
- (d) a DNA sequence which is identical to the extent of at least 80% to a DNA which codes for a polypeptide which comprises the amino acid sequence of SEQ ID NO:2;
- (e) a DNA sequence which is identical to the extent of at least 90% to a DNA which codes for a polypeptide which comprises the amino acid sequence of SEQ ID NO:2;
- (f) a DNA which codes for a polypeptide which comprises an amino acid sequence which is identical to the extent of at least 80% to the amino acid sequence of SEQ ID NO:2, the polypeptide preferably having the activity of the transcriptional activator CobR for genes involved in vitamin B₁₂ synthesis;
- (g) a DNA which codes for a polypeptide which comprises an amino acid sequence which is identical to the extent of at least 95% to the amino acid sequence of SEQ ID NO:2, the polypeptide preferably having the activity of the transcriptional activator CobR for genes involved in vitamin B₁₂ synthesis.

2. The process of claim 1, wherein said host organism is *Pseudomonas denitrificans*, *Agrobacterium radiobacter*, or *Sinorhizobium meliloti*.

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3. The process of claim 2, wherein said host organism is *Pseudomonas denitrificans* CEEX6 or *Pseudomonas denitrificans* PF1-48, both deposited with the DSMZ under the Budapest Treaty.
4. A process for discovering genes involved in vitamin B₁₂ biosynthesis by using binding activity of a polypeptide encoded by the isolated DNA of any one of (a) to (g) in claim 1 against vitamin B₁₂ biosynthesis genes.
5. An isolated DNA comprising a nucleotide sequence that encodes CobR, which is a transcriptional activator for genes involved in vitamin B₁₂ synthesis, selected from the group consisting of:
 - (a) a DNA sequence identified by SEQ ID NO:1 or the complementary strand thereof;
 - (b) a DNA sequence which is more than 90% identical to the DNA sequence according to SEQ ID NO:1;
 - (c) a DNA sequence which codes for a polypeptide having the amino acid sequence encoded by the DNA sequence of (a);
 - (d) a DNA sequence which is identical to the extent of at least 90% to a DNA which codes for a polypeptide which comprises the amino acid sequence of SEQ ID NO:2;
 - (e) a DNA which codes for a polypeptide which has an amino acid sequence which is identical to the extent of at least 95% to the amino acid sequence of SEQ ID NO:2, the polypeptide preferably having the activity of the transcriptional activator CobR for genes involved in vitamin B₁₂ synthesis.
6. A vector or plasmid comprising the isolated DNA of any one of (a) to (e) in claim 5.
7. A host organism transformed or transfected by the isolated DNA as claimed in any one of (a) to (e) in claim 5 or by the vector or plasmid as claimed in claim 6.
8. A polypeptide encoded by the isolated DNA as claimed in any one of (a) to (e) in claim 5.
9. A process for the production of the polypeptide as claimed in claim 8 having activity of transcriptional activator for genes involved in vitamin B₁₂ synthesis, which comprises culturing the host cell as claimed in claim 7 under the conditions conducive to the

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production of said polypeptide, wherein the host cell is selected from the group consisting of
Pseudomonas denitrificans, *Agrobacterium radiobacter*, *Agrobacterium tumefaciens*.